How to
Select, Use and Care for
QUALITY WRENCHES

TOOLFACTS

NEW!
ADDED FEATURE

SAFETY TIP

Look for this symbol throughout booklet for valuable safety tips.

WILLIAMS

Prepared by
J. H. WILLIAMS & CO.
DIVISION OF UNITED-GREENFIELD CORPORATION
Buffalo 7, N. Y.

A Wrench is known by the company it keeps...and by the company that makes it!

Ask any experienced mechanic... he'll tell you a wrench is only as good as its design and quality of manufacture.

Knowing what to look for when buying a wrench and how to use and care for it on the job, can pay big dividends in long-lasting performance and faster, safer work.

This booklet has been prepared to help you recognize the many features of quality wrenches. It will give you a quick, professional working knowledge of many little-known "TOOL FACTS" that you can put to use immediately.

Years of research and testing on the job precede the manufacture of all Williams wrenches. Preparation of dies and tooling and all production operations are under continuous material and process controls. This is why Williams stands behind each wrench with a quality guarantee against defective workmanship and materials.

You'll find this concept of "making only the finest" explained in greater detail under the following classifications:

Williams wrenches are nationally available through Industrial Distributors, Automotive Jobbers, Hardware and Tool Stores.

1 The Metallurgical Department carefully selects the bar stock for each production order and also specifies exact forging temperatures that will yield the best physical properties for each wrench design.

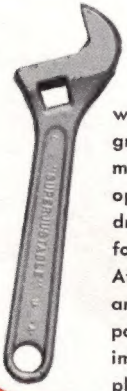
2 The fuller operation, first in the forging series made in closed impression dies, forms the stock in a manner to provide adequate metal in the proportions required to obtain the best grain flow.

3 The blanker operation on the same dies forms the wrench into its first definite shape.

The sequence steps shown here for the manufacture of an adjustable wrench are typical of the many close-tolerance operations involved in making all Williams quality wrenches. To safeguard this quality, wrenches are checked for correctness and proper adherence to specifications every step of the way.

4 In the same heat, the finisher, or final forge operation, completes the wrench in its forged state.

5 After the forging has cooled, excess metal, or flash is cold trimmed in a punch press using carefully matched trimmer dies.



6 After cleaning to remove forging scale, wrench is heat-treated to refine grain structure and to improve machinability. Various finishing operations, such as profiling, drilling, and broaching, are performed to exact specifications. After handle and movable jaw are assembled, wrench is face-polished, heat-treated for maximum toughness and chrome plated.

ALLOY WRENCHES

QUALITY FEATURES IN DESIGN

Alloy wrenches are the last word in strength and toughness . . . forged from special alloy steel to withstand the demands of heavy industrial use. They may be recognized from carbon or black finish wrenches by their lighter weight, thinner heads and bright finish.

The selection of the proper type of wrench for a given job is most important. Williams offers 40 styles of alloy wrenches totaling over 450 sizes. Everything being equal, choose a box wrench first, then an open-end, finally an adjustable wrench.

Box wrenches are the safest. They are less liable to slippage since the nut is gripped on all sides. Many are offset to allow clearance for obstructions and space for the mechanic's hands.

Open-end wrenches are thoroughly dependable if both the nut and wrench are correct in size or fit. Most wrenches made in the U.S.A. are stamped with the nominal size of their opening. These openings are usually .005 to .040 larger (depending on size) than standard nuts and bolt heads, to allow for nut and bolt manufacturing tolerances. Too large an opening may slip under a hard pull and round the corners of the nut.

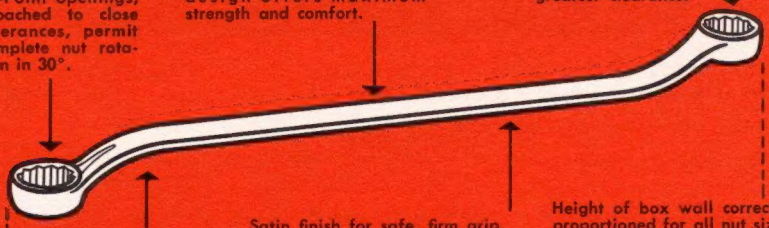
Adjustable wrenches offer maximum convenience, but are inherently less safe than solid wrenches. Adjustment to the flats of a nut must be carefully made for a snug, squarely-seated fit. Even so, the chance of slippage under a hard pull is greater than with the preceding two styles. Such slippage can be practically eliminated by using Williams locking style adjustable wrench.

SAFETY TIP

Regardless of the type used, always PULL a wrench unless there is no other choice. Pushing a wrench is dangerous and may result in injury to the hands. Greasy hands or greasy wrenches are dangerous. A dry, clean grip always permits the hardest, safest pull. Hammering on a wrench or slipping a pipe over the handle to increase leverage puts a strain on the jaws which they are not designed to take. This practice usually results in spreading the jaws beyond further use.

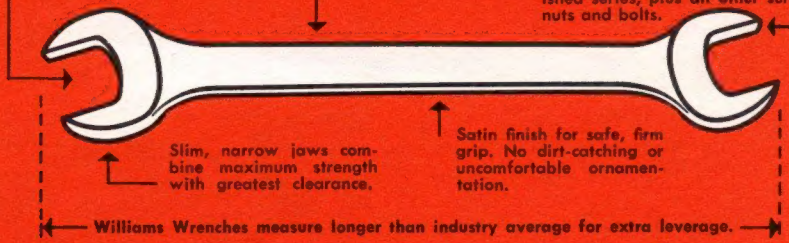
Learn to develop a sense of feel when tightening nuts and bolts. An inexperienced wrench user will often exert pressure to the point of stretching the bolt body or almost stripping the threads. Unfortunately, this strained condition cannot be seen and serious damage might result from subsequent bolt breakage. The ordinary man can readily break bolts and strip threads up to ½" or ⅝" bolt diameters. Bolts ¾" and larger cannot usually be set too tight with average wrench leverage. Where tension is of considerable importance, the use of a torque measuring wrench is indicated.

BOX WRENCHES



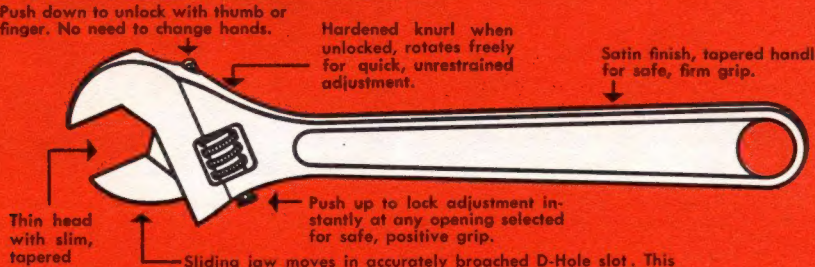
Williams Wrenches measure longer than industry average for extra leverage.

OPEN END WRENCHES



Williams Wrenches measure longer than industry average for extra leverage.

ADJUSTABLE WRENCHES



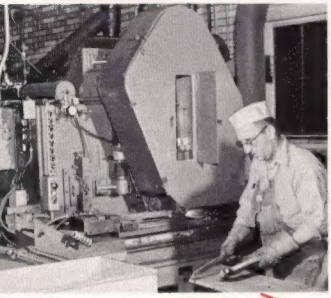
ALLOY WRENCHES

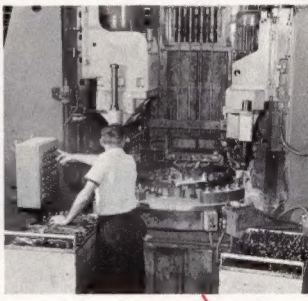
QUALITY FEATURES IN MANUFACTURE

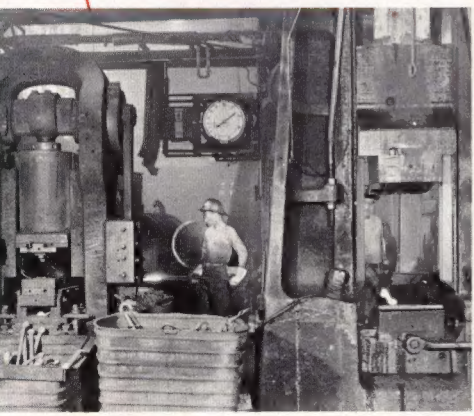
Feel and finish are refined on this automatic profiling machine. All rough edges are completely removed. Wrench handles are profiled to uniform dimensions and are blended into the heads for greatest strength.

Here wall thicknesses are machine-controlled to exact concentricities. This extra step produces heads offering uniform clearances from wrench to wrench . . . pattern to pattern.

Developed specially for Williams, this three-station transfer machine drills, broaches and chamfers. Box openings are machined to tolerances well within industry standards for long-lasting, sure-grip fit.





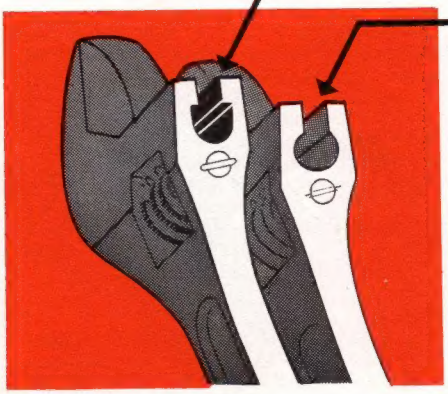


Forging temperatures for each of Williams' 65 hammers are automatically controlled by sensitive pyrometric instruments which comply with rigid aircraft specifications. The result is tough, fine-grain forgings every time. Die matching is held to close tolerances for maximum structural uniformity.

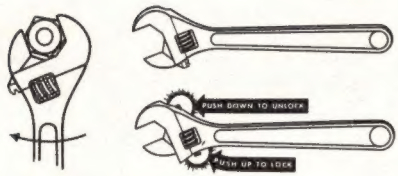
Special conveyorized heat-treating equipment automatically heats and quenches forgings in a series of salt baths to prevent decarburization and dimensional distortion often found in other wrenches. It further develops the relationship of toughness and hardness to the optimum.

Automated machining guarantees smooth adjustment, exact fit in every wrench. This million dollar transfer machine was designed especially for Williams' Superjustable® wrench production. A push of a button puts 28 stations in operation . . . consistently machining to uniformly close tolerances. Fully machined wrench heads are constantly checked on special gauges to further insure perfect fit with sliding jaws, worms, pins and springs.

ONLY WILLIAMS HAS THIS EXCLUSIVE D-SLOT DESIGN

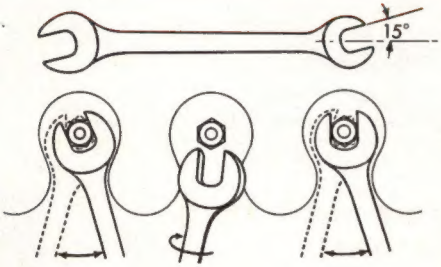


Williams' unique D-Slot design provides wide, square-shouldered tracks for full, positive bearing of the sliding jaw under any working stress. Slot is not subjected to spreading forces common to other adjustable wrenches. Performance is consistent . . . parts replacement infrequent.



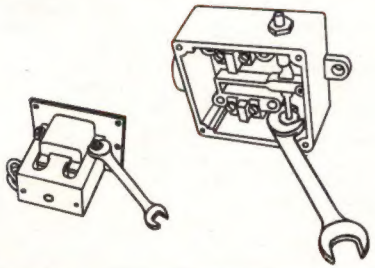
ADJUSTABLE WRENCHES. Always adjust worm so that jaws fit snugly. Use the locking model to secure the opening adjustment for repeated use on nuts or bolt heads of the same size. Worm and movable jaw should be cleaned and oiled occasionally to reduce wear.

SAFETY TIP *"Pull" rather than "push" on the wrench handle, with the wrench head placed on the nut or bolt in the position illustrated.*



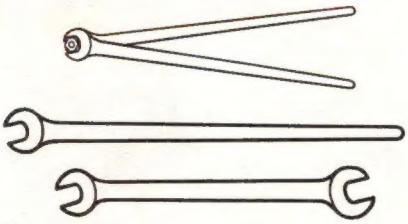
SINGLE-DOUBLE HEAD OPEN END WRENCHES. Jaws of most open end wrenches are at a 15° angle to the handle. This allows complete rotation of hex nuts in only 30° swing by "flopping" the wrench.

SAFETY TIP *Fully engage jaws with nut. Under no circumstances should handle be hammered or extended with pipe for extra leverage. Use a striking face wrench which is designed for loosening frozen nuts or to set them up tightly.*



MIDGET 15° AND 15°-75° WRENCHES. For assembly, adjustment and repair of electrical components and instruments, these wrenches offer a choice of opening angle to meet the peculiarities that exist in this type of equipment.

SAFETY TIP *Wrenches that are merely stamped or punched out from flat stock are bulky and loose fitting and do not offer the safe, snug-fitting, slim-jaw performance of drop-forged wrenches.*

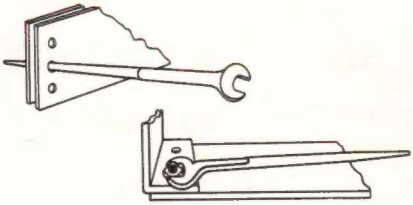


SINGLE AND DOUBLE HEAD TAPPET WRENCHES. Extremely thin lock or adjustment nuts are often best serviced with tappet wrenches. Their thin heads and extra long handles are a decided convenience when servicing engines while hot.

SAFETY TIP *Do not grind or thin down faces, walls or jaws on wrenches. This weakens them structurally leaving them highly susceptible to cracking.*

WRENCHES

CONSTRUCTION AND STRUCTURAL WRENCHES. Both styles of wrench have long handles for extra leverage and are tapered for easy insertion in bolt holes to bring them in line. Structural pattern has the additional advantage of an offset handle for clearing obstructions.

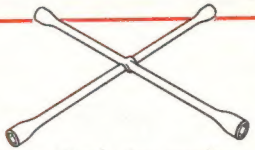


SAFETY TIP *In lining up bolt holes on steel work or flanges do not hammer wrenches to effect alignment. Hole and wrench damage can be severe.*

SPECIAL AUTOMOTIVE WRENCHES

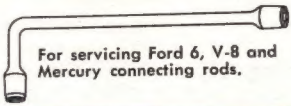
For starter and manifold nuts on Chrysler Corp. passenger cars.

For starter nuts on Chevrolet and other make passenger cars.



Four different hex openings service wheels on all popular makes of cars and trucks.

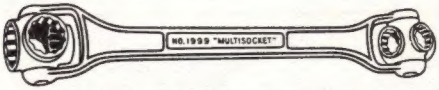
For adjusting star nuts on two-shoe Bendix brakes.



For servicing Ford 6, V-8 and Mercury connecting rods.

For servicing slotted anchor pins, drag links and steering posts.

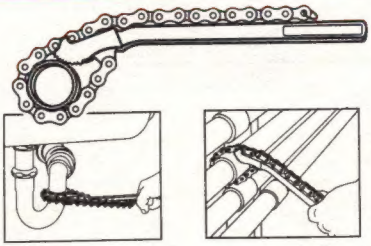
MULTISOCKET. Eight different 12-point openings offer a wide range of use. Heads swivel, index spring retains working angles.



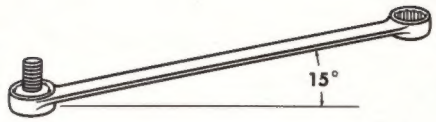
SAFETY TIP *Keep heads clean and free from dirt. Occasionally clean and oil swivel joints.*

Multisockets are very popular on farms for making all types of machinery adjustments and repairs. Many household and car repairs can be made with this multi-purpose, socket-type wrench.

CHAIN WRENCH. With this type of tool, successive bites can be taken without removing the wrench from the work. It is particularly useful in unusually close quarters. Certain types of oil filters are also best serviced with this style wrench.

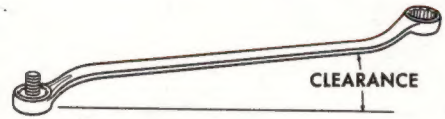


SAFETY TIP *Teeth must be kept sharp. Never let them become rounded. At the first sign of wear they can be easily resharpened with a medium file.*



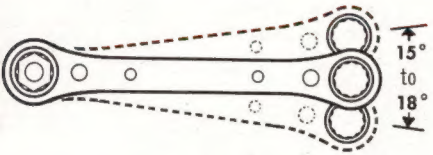
15° DOUBLE OFFSET BOX WRENCHES. Thin walls for close quarters and long handles for good leverage. 15° offset offers obstruction clearance with ample space for mechanic's hand. 12-pt. box for continuous rotation of nuts in only 30° swing.

SAFETY TIP *It is extremely hazardous to modify this style for tubing work by removing a section of the box wall. Use a flare-nut wrench.*



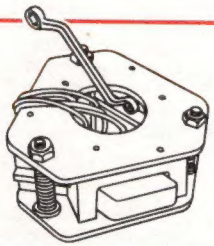
DOUBLE OFFSET BOX WRENCHES. This type, often referred to as a 45° offset wrench, is made in short, long and heavy service styles. In many instances it offers better obstruction clearance, as well as all of the other features of the 15° offset style.

SAFETY TIP *Frequently check points for wear. Avoid using on case hardened fasteners.*



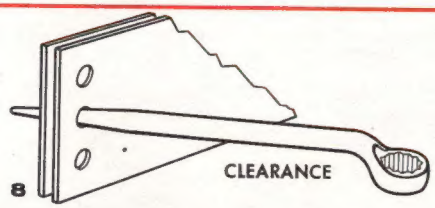
RATCHETING BOX WRENCHES. While this type does not offer the clearance advantages of the fixed-box type, its ratcheting feature is a decided convenience. The smaller sizes require only 18° and larger sizes only 15° swing to completely rotate hex nuts.

SAFETY TIP *Keep ratcheting mechanism in good working order by occasional lubrication with light oil.*



MIDGET-BOX WRENCHES. Offset design offers the advantage of obstruction clearance over flat, midget open-end styles.

SAFETY TIP *Strong, hex box and drop-forged construction provide the additional strength and safe, firm grip required to loosen small, corroded or frozen hex nuts sometimes encountered in carburetor and electrical work.*



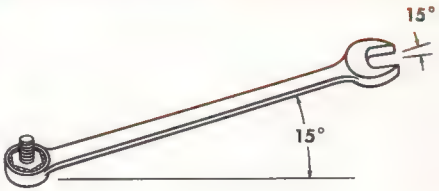
STRUCTURAL BOX WRENCHES. This is the ideal type of structural wrench for heavy work. Handles are long and tapered for easy insertion in lining up bolt holes. Offset for obstruction clearance.

SAFETY TIP *Where possible use box rather than open end structural wrench for safer grip on hex nuts.*

WRENCHES

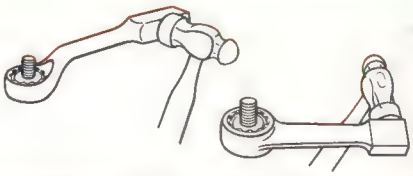
OPEN-END BOX WRENCHES. This design, made in long and short patterns, is particularly useful in tight spots. Both ends have the same opening size. The box head is offset 15° from the plane of the handle for obstruction clearance.

SAFETY TIP *For the safety minded, this is one of the best styles to carry in a kit. With two head types the one best suited to the job can be used.*



STRIKING FACE BOX WRENCHES. These wrenches are designed for heavy work where large nuts must be set up tight or frozen nuts loosened. Anvils are proportioned to opening size.

SAFETY TIP *Unless obstructions require the use of the offset style, it is safer to use the straight pattern.*

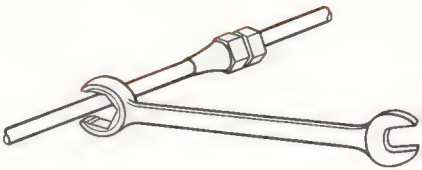


REGULAR AND HEAVY 12-PT. BOX WRENCHES. These styles offer a firmer, safer grip than is possible with open end wrenches. The heavy duty style provides extra strength in limited areas through their higher head walls which also give full contact area on large hex nuts.

SAFETY TIP *Use the heavy duty, "high-collar" style for maximum safety under extreme torquing.*

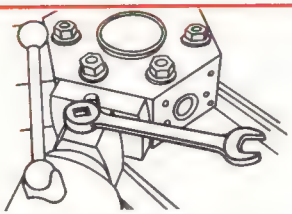
FLARE-NUT WRENCHES. Designed for use on flare nuts and fittings on tubing assemblies for hydraulic, pneumatic and air conditioning equipment. The hex open-box slips over the tubing. Thick head face prevents marred fittings in tightening.

SAFETY TIP *Tube opening slot of box head is located at 22½° to the axis of handle for easiest, safest use.*



TOOL POST WRENCHES. Preferred by many machinists over the straight type because of the clearance provided. Use open end for making tail stock adjustments. One wrench does two jobs.

SAFETY TIP *Box end, with 15° offset from plane of handle, safely clears obstructions on many tool posts.*



DETACHABLE SOCKET WRENCHES

On most jobs . . . big or small . . . from tiny instrument assemblies to massive structural work, Williams' range of 98 Drivers and 270 Sockets offers endless combinations to solve any conceivable nut turning problem. The wrench you need is only a matter of seconds in the making.

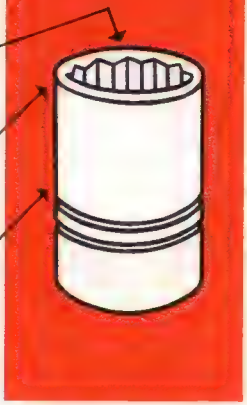
Speed and ability to reach restricted areas make the detachable socket system the most popular of all wrenches. The table below will be helpful in selecting the drive size appropriate to the range of socket openings desired.

SQUARE DRIVE SIZE	SIZE RANGE OF AVAILABLE SOCKET OPENINGS									
	REGULAR LENGTH				EXTRA DEEP			UNI-VERSAL	METRIC	CROW FOOT
	6-Point	12-Point	4-Point	8-Point	6-Point	12-Point	8-Point	12-Point	M/M	Open End
¼	3/16-½	5/16-½	3/16-¼	5/16 – 3/8	¼ – ½	5/16-½	.....	.....	.....	.....
3/8	¼-¾	¼-7/8	.....	.....	3/8-7/8	3/8-7/8	9/32-5/8	3/8-¾	.....	3/8-11/16
½	3/8-1	3/8-1¼	.....	5/16-1	13/16	½-1⅛	.....	½-¾	10-36	.....
¾	.....	7/8-2¼	.....	.....	.....	15/16-1 7/16	.....	.....	.....	.....
1	.....	1 1/16-3⅛	.....	.....	.....	.....	.....	.....	.....	.....

Most mechanics, tradesmen and industrial concerns find it advantageous to buy detachable sockets and drivers by the set. Leading wrench manufacturers offer set assortments to meet a number of different requirements. In the Williams line there are over 100 specially designed sets. From electric and telephone service men to diesel-engine mechanics and millwrights, the socket and driver assortments in these sets are selected to best perform the type of work for which they are designed.

QUALITY FEATURES IN DESIGN

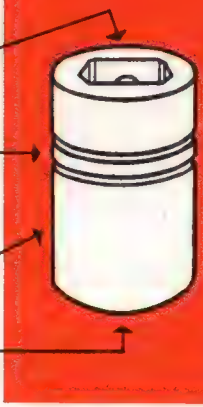
SOCKETS



Opening depths proportioned for proper nut seating. Through hole provides for bolt clearance.

Openings pressure-formed to finer tolerances than government requirements or industry standards.

True, straight, thin-wall design. Noses are not rounded to obscure thick walls. Wall thickness and O.D. proportioned to opening size on each and every socket.



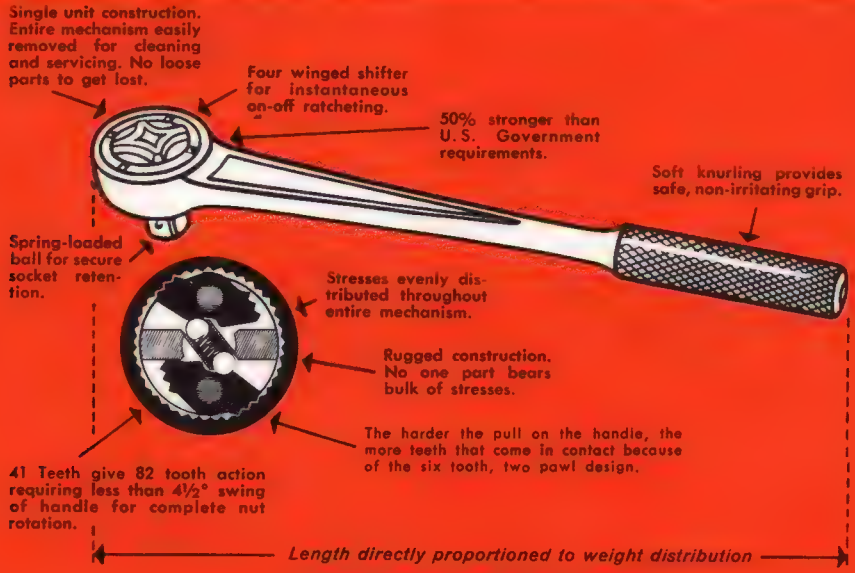
Detents on four sides eliminate fumbling in attaching sockets to drivers.

Double grooves provide means for firm grip and easy detachment from drivers.

Length proportioned to opening size on all regular sockets.

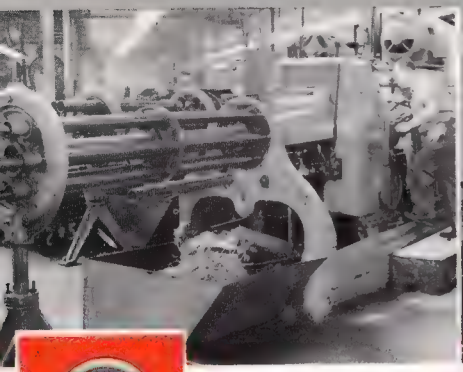
Openings on both ends concentric with outside diameter.

RATCHETS

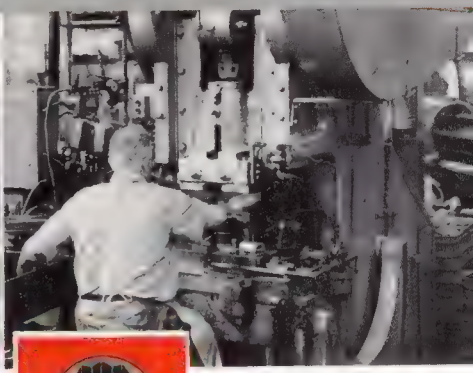


SOCKET WRENCHES

QUALITY FEATURES IN MANUFACTURE

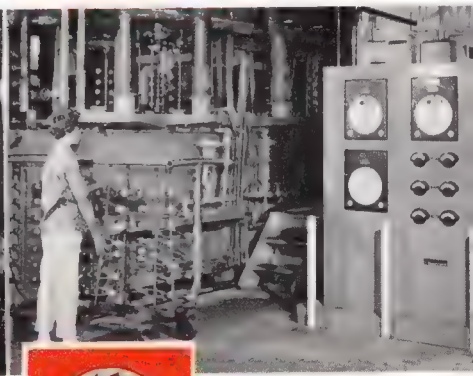


Cold rolled bar stock is ordered sufficiently oversize to allow for removal of imperfections and decarburized surfaces. Outside nose and drive-end diameters are formed to individual proportions on a battery of screw machines.

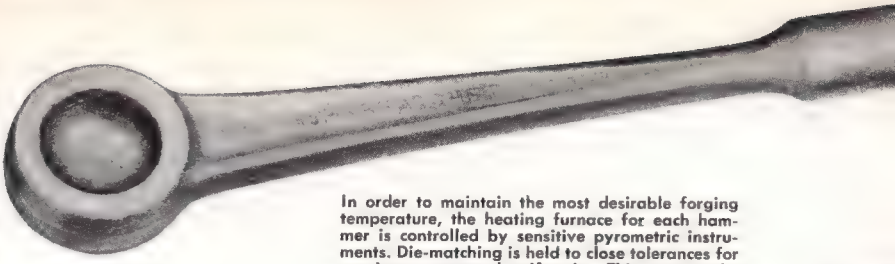


Socket blanks are induction-heated for hot forming the drive and nut openings. Over-heating of the steel is avoided and decarburization is prevented. Unusual accuracy is attained and the grain structure of the metal remains unbroken. Openings are formed without tears or ruptures.

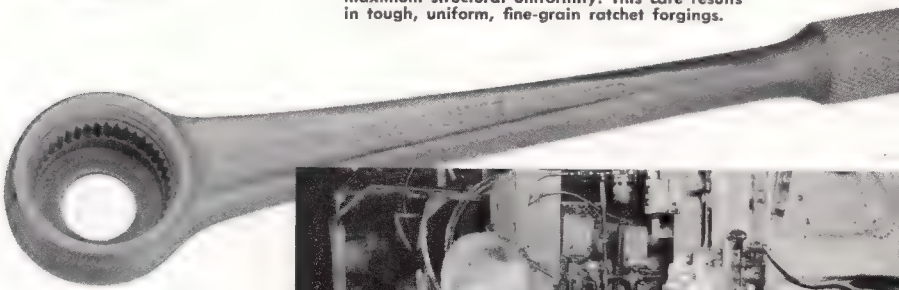
Centerless grinding produces a true-round, high polish that retains the original concentricity. Sockets are rough ground before and finish ground after iso-thermal heat-treatment. This type of heat-treating refines and toughens the steel, without distortion or decarburization of the socket surfaces.

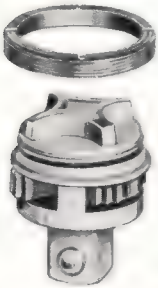


The continuous, automated plating process is under constant timing and temperature control through electrical instruments. Chemistry of the bath solutions is constantly checked to assure uniform deposits of nickel and chrome that will form durable non-corrosive, non-peeling, protective surfaces.

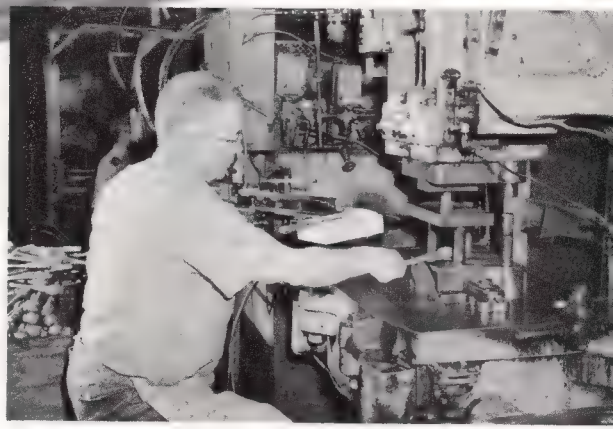


In order to maintain the most desirable forging temperature, the heating furnace for each hammer is controlled by sensitive pyrometric instruments. Die-matching is held to close tolerances for maximum structural uniformity. This care results in tough, uniform, fine-grain ratchet forgings.





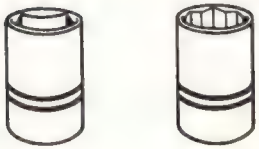
This single-unit assembly is made up of precisely-machined components. Each unit is carefully inspected, lubricated and tested before and after it is assembled with the handle.



Heads are induction heated prior to hot-forming the 41 teeth on the inside perifery. This method produces smooth, highly accurate surfaces which the teeth of the hardened ratcheting pawls are to engage. Completely machined ratchet blanks are then heated and quenched in a series of salt baths to develop the proper relationship of toughness and hardness without decarburization or dimensional distortion.

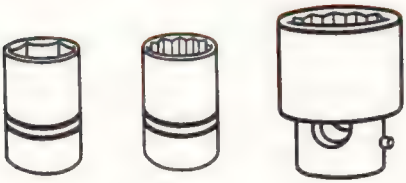
From bright finished head to knurled handle, from forging to nickel-chrome plating, Williams' Reversible Ratchets offer unmatched quality throughout.

DETACHABLE



REGULAR 4 AND 8-POINT SOCKETS. Designed expressly for square nuts and bolt heads, such as found on set, machine, and lag screws, stove bolts and nuts. Made in ¼", ⅜" and ½" drives with openings up to 1".

SAFETY TIP *Use wherever possible in preference to open end wrenches for safer, four sided grip.*

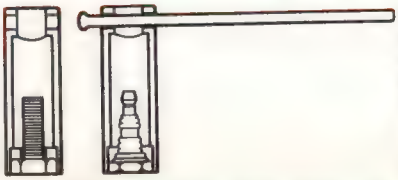


REGULAR 6 AND 12-POINT SOCKETS. Plus rapid seating, the 12-point style requires only half the swing of hex sockets when used with non-ratcheting drivers. All sockets in the 1" drive have cross holes for sliding bar and safety attachment device for positive locking with drivers.

SAFETY TIP *Use 6-point sockets when servicing undersize or badly worn nuts. Guarantee is void when hand sockets are used on impact guns.*

EXTRA DEEP 8-POINT SOCKETS. Particularly useful in running down and taking off lock nuts. Under certain conditions, it is possible to avoid the use of an extension by using an extra deep socket.

SAFETY TIP *It is always well to remember that the safest, most efficient socket and driver assembly is the one made up of the fewest drive parts.*



EXTRA DEEP 6 AND 12-POINT SOCKETS. Designed for use on spark plugs and nuts where the bolt or stud extends considerably beyond the surface of the nut face.

SAFETY TIP *Where obstructions will permit, use a deep socket for clearance rather than a regular socket and extension.*

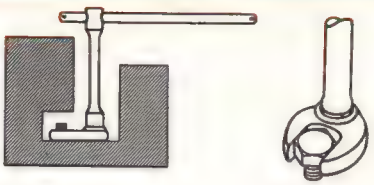
SPARK PLUG SOCKETS. The most popular spark plugs, currently in use, require a 13/16" hex opening. This specially designed socket, made in ⅜" drive only, is ideal for use in restricted quarters. Rubber insert holds and protects plug.

SAFETY TIP *In unusually tight spots take advantage of the ¾" hex on the top of the socket.*

SOCKET WRENCHES

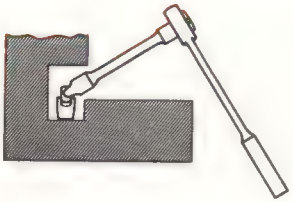
CROWFOOT ATTACHMENTS. By coupling with extensions and drivers, such as offset and flex handles, the operator can work these attachments into some extremely tight spots. Made in ⅜" drive only with openings ⅜" to 1 1/16".

SAFETY TIP *Accessibility of some nuts is only possible in a safe manner with crowfoot attachments.*



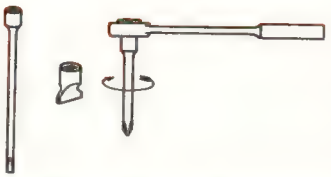
UNIVERSAL SOCKETS. Nuts in very restricted areas can sometimes be reached only with a universal socket. Some spaces are so tight that they will not even permit the use of a socket and universal joint. Made in ⅜" and ½" drives with 6 and 12-point openings from ⅜" to ¾". Operating range is approximately 130°.

SAFETY TIP *Be sure socket is fully seated on nut. Use at least angle possible for safest operation.*



REGULAR AND PHILLIPS SCREWDRIVERS. Ideal where leverage is required beyond that provided by the average screwdriver. Various driver combinations and the convenience of ratcheting action make these tools invaluable.

SAFETY TIP *Use of extensions and adapters with these attachments should be avoided for best rigidity.*



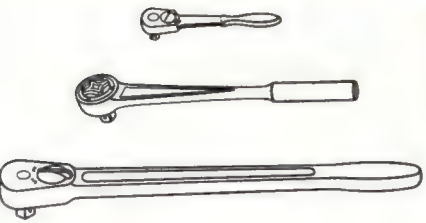
HEX AND SCREWDRIVER BITS AND SOCKETS. Replaceable bits extend the detachable socket system to driving hollow head, slotted and Phillips screws. Adapter sockets are made in ¼", ⅜", ½" drives.

SAFETY TIP *Combine with various drivers to make safe, efficient tools to meet almost any situation.*

REFRIGERATION SOCKETS AND RATCHETS. Service on industrial refrigeration and air conditioning units require special sockets for various gland and packing nuts. These ¼" drive sockets can be used with MR-51 Refrigeration Ratchet.

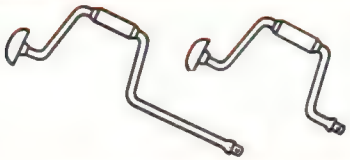
SAFETY TIP *Makeshift tools are hazardous and inefficient. Use special tools designed for special work.*

DETACHABLE



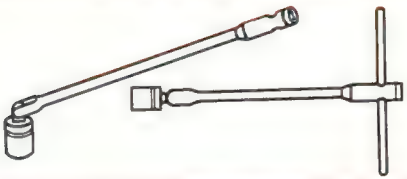
REVERSIBLE RATCHETS. As with other tools having mechanical parts, ratchets should receive good care for best service and longest life. With regularity, ratchets should be immersed in light machine oil overnight. Rotate or spin ratchet to flush out dirt or hardened lubricant and to remove excess oil.

SAFETY TIP *Extensions or "persuaders" should not be used on ratchet handles. Use a larger drive size.*



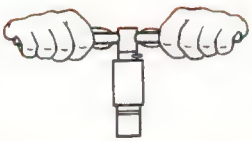
SPEEDERS. Various extensions and universal joints combine readily with speeders to reach many otherwise inaccessible places. In ½" drive Ratchet Adapter and Speeder make an excellent combination.

SAFETY TIP *When using speeders use sockets of the same drive size. It is risky to adapt up or down.*



FLEX HANDLES. Occasional lubrication of the flex joint and retaining ball and spring will reduce wear. Maximum leverage in relation to drive size is "built-in" on most flex handles.

SAFETY TIP *Additional leverage gained by extending handle invites injury and is sure to damage tool.*



SLIDING T-HANDLES. Excellent as an offset tool, spinner or for two-hand use. This driver combines readily with sockets, extensions, universals and adapters to make a wide variety of highly useful tool combinations in all drive sizes.

SAFETY TIP *This is another tool where temptation to extend leverage with pipe should be avoided.*

EXTENSIONS. Extensions will engage with sockets and drivers more readily by occasionally lubricating the ball and spring on the male end and cleaning out the female end. It is unwise practice to build extension on extension. Use a single extension of the proper length.

SAFETY TIP *Use the shortest extension possible on all jobs to assure safe, rigid working conditions.*

SOCKET WRENCHES

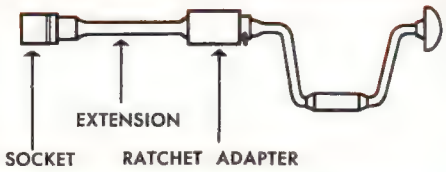
TORQUE WRENCHES. Precision torque measuring tools should be handled with more than the normal care. Never file, etch, stamp or otherwise disfigure the bar on any torque wrench. This will seriously damage its torque-measuring ability and accuracy.

SAFETY TIP *Never exceed the maximum reading of the tool. In continuous use it is best to stay within 75% of its rated capacity.*

For example: where a torque of 150 foot lbs. is to be measured, it is best to use a tool of 200 foot lb. capacity.

RATCHET ADAPTERS. The same lubrication instructions used for ratchets, as described on opposite page, apply also to the ratchet adapter.

SAFETY TIP *In an assembly using the ratchet adapter place it as close to the operator as possible for safe, convenient access to the shift lever.*

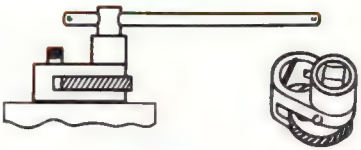


UNIVERSAL JOINTS. While universal joints may be used up to angles of 65°, the lesser the angle the more efficient the operation. Retard wear with lubrication.

SAFETY TIP *Universal joints should never be used as right angle drivers. This type of work should be done with flex or sliding tee-handles.*

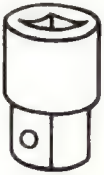
STUD REMOVERS. The knurled eccentric is specially hardened to resist the extreme wear to which this part is subjected. Eccentric has two pivot holes to be interchanged according to diameter of stud.

SAFETY TIP *Replace knurled eccentric at first sign of wear. Liberal use of penetrating oil should always be a pre-requisite of stud removal.*



ADAPTERS. Adapters are available for use on sockets with attachments of larger or smaller drive sizes. See table.

SAFETY TIP *Caution must be exercised to not use the full leverage of drivers when adapting to sockets of a smaller drive size.*



DOWN Can Be Adapted To Drive Sockets in This Drive Size	Originating Drive Size	UP Can Be Adapted To Drive Sockets in This Drive Size
—	¼	⅜
¼	⅜	½
⅜	½	¾
½	¾	1
¾	1	—

INDUSTRIAL BLACK

The same high quality in design and manufacture that is so outstanding in the Williams Alloy Wrench line is continued on through the industrial group of wrenches. It is finish alone that makes the major distinction between the two lines.

Design and finish are in character with the class of work for which the Industrial Black Finish Wrenches are used. In many cases, the handles and general conformation of these wrenches are heavier than alloy types.

The black finish is durable and rust resistant. Fine head and face polish are omitted to lower average cost. This is important in industrial wrenches. Heavy use, loss on the job and other factors contribute to a high replacement rate in many industries.

It is fitting, therefore, that larger sizes and some of the more specialized styles of wrenches be made available in this lower cost industrial finish.

There are 33 patterns in the Williams Black Finish line, involving 554 sizes. Superector® Ratchet Wrenches are available in 5 ratchet sizes and 52 different sockets. The Impact Socket line comes in 7 drive sizes with over 400 sockets and attachments.

ADJUSTABLE WRENCHES. Occasional cleaning and lubrication of the worm or knurl and sliding jaw will keep adjustable wrenches in good working condition.

SAFETY TIP *Wherever possible it is important that working stresses be directed toward the fixed jaw position of the wrench head. "Pull" rather than "push" on the wrench handle.*

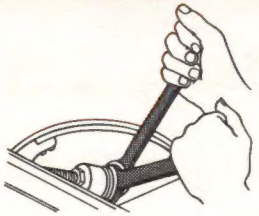
SINGLE-DOUBLE HEAD OPEN END WRENCHES. Openings from 3/16" to 7 5/8" permit a range of applications unparalleled in industry. From delicate instruments to heavy bridge and construction work the wrenches perform with equal facility.

SAFETY TIP *Always be sure nut is fully seated in jaws. Use wrench in same plane as nut or bolt head.*

FINISH WRENCHES

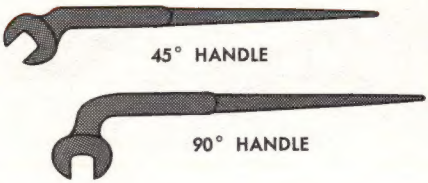
CHECK NUT OR THIN WRENCHES. Unusually thin heads for servicing extremely thin adjusting and lock nuts found on many types of machines. Made in single and double head patterns with openings from $^{13}/_{32}$" to $1\,^{11}/_{16}$".

SAFETY TIP *These wrenches are guaranteed amply strong for intended purpose, not for severe service.*



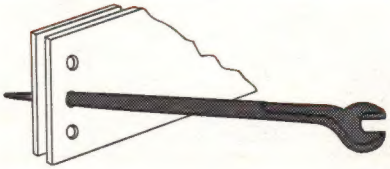
CONSTRUCTION WRENCHES. Available with straight as well as 45° and 90° bent handles, an added convenience in pipeline and flange work where steam lines run tight to walls or bulkheads.

SAFETY TIP *Better to use wrenches designed for cramped quarters than to improvise unsafe adaptations.*



STRUCTURAL WRENCHES. Long handles and tapered ends for lining up bolt holes are features of this style. Offset handle clears obstructions and provides gripping space for operator's hand.

SAFETY TIP *Do not use handles as pry bars. Lack of flat surfaces make them prone to slippage.*

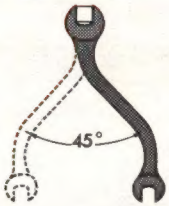


SET SCREW WRENCHES. Head heights of set screws are greater than ordinary bolt heads and require wrenches of more than average head thickness. Jigs, fixtures and machine tools involving frequent adjustment, most often, use hardened set screws.

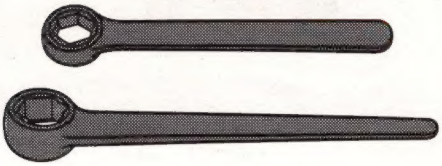
SAFETY TIP *Thick heads and 3-point contact offer greater safety and longer life than regular open ends.*

"S" OR CAR WRENCHES. Square nuts require a 90° swing for complete rotation with most open end wrenches. The "S" design permits flopping the wrench to reduce swing to 45°.

SAFETY TIP *This style is favored by industries where square nuts and bolt heads are commonly used. The safest wrench is one designed for the job.*

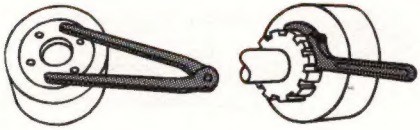


INDUSTRIAL BLACK



REGULAR AND HEAVY HEX BOX WRENCHES. Often preferred over open end types. The deep box walls of the heavy style permit minimum head diameter with maximum strength for close work up to 3⅛" opening.

SAFETY TIP *Be sure to keep all wrenches and tools clean. Grease and dirt accumulation will hide wear and defects. Remember, safety first.*

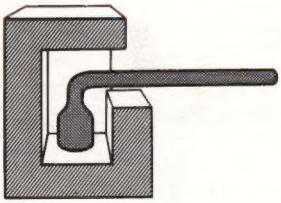


ADJUSTABLE SPANNER WRENCHES. Made in pin and hook styles. Each size will service several sizes of adjusting collars, lock nuts, rings and bearings.

SAFETY TIP *Although hooks and pins are tempered for long wear, discard if ends become worn or chipped.*

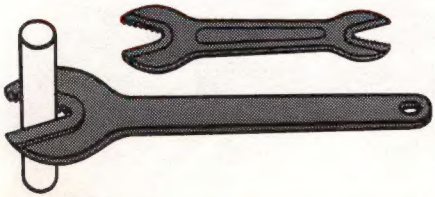
TEE HANDLE SOCKET WRENCHES. Flanges, caps and assemblies of many kinds have unavoidable obstructions requiring the use of this style wrench.

SAFETY TIP *Note shanks have hexagon ends. For safe, extra leverage, remove pin and use adjustable wrench. Never use pipe on the tee handles.*



OFFSET SOCKET WRENCHES. Certain obstruction problems require the use of this offset style wrench. Made with hex or square openings.

SAFETY TIP *Handle lengths are proportioned to opening size to provide adequate leverage. Extending with pipe is not recommended. Try using a socket and long flex handle instead.*

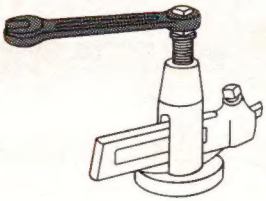


BULL DOG WRENCHES. These wrenches will grip pipe, square, hex or round shapes or any others that will fit between their strong tough jaws. Often used for holding while nuts, sleeves, collars and connectors of various types are being turned. The Bull Dog wrench is a popular style with railroads and shipyards.

SAFETY TIP *Do not use after teeth have become rounded. Either file sharp or replace wrench.*

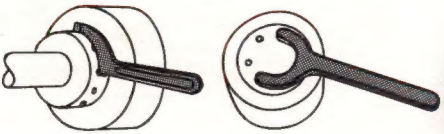
FINISH WRENCHES

TOOL POST AND SQUARE BOX WRENCHES. Machine tools and industrial equipment are often supplied with wrenches of this type where numerous set screw adjustments are continuously required.



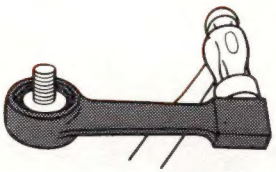
SAFETY TIP *Head thicknesses are proportioned to grip the full height of screw heads regardless of size. Do not substitute with regular open ends.*

SPANNER WRENCHES. Pin, face and hook style spanners are made to many standard dimensions for turning packing glands and adjustable collars, etc.



SAFETY TIP *Pins and hooks are accurately machined for proper fit. Do not use 'home-made" tools.*

STRIKING FACE WRENCHES. Nuts requiring wrench openings from 3⅜" to 4⅝" often require considerable "persuasion" to set them up tight, or to break them loose.

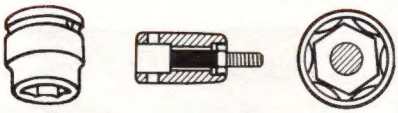


SAFETY TIP *This straight handle style is designed to stand the abuse of sledging. Firmly seat wrench on nut before applying force to anvil.*

SUPERECTOR® WRENCHES. Heavy construction work in bridge and steel structures and heavy machinery, using nuts up to 4⅝", require rugged tools. Sockets have thru-holes so that nuts may be turned all the way down on any length stud.

SAFETY TIP *Ratchet lengths from 24" to 53" allow plenty of leverage without the use of heavy pipe extensions.*

POWER DRIVE SOCKETS. Made of extra tough alloy steel, specially heat-treated to withstand the constant shock and pounding involved in electric and pneumatic impact nut setting and power nut running. Surface drive sockets are designed to contact the flats rather than the corners of hex nuts and have the advantage of self-seating as required on multiple nut runners. Magnetic styles are used for self-tapping screws.



SAFETY TIP *Two "don'ts" particularly apply to power sockets. Do not substitute bent nails for the proper retention methods. Do not use hand type sockets on power equipment.*

A Wrench is known by the company it keeps...and by the company that makes it!

Ask any experienced mechanic... he'll tell you a wrench is only as good as its design and quality of manufacture.

Knowing what to look for when buying a wrench and how to use and care for it on the job, can pay big dividends in long-lasting performance and faster, safer work.

This booklet has been prepared to help you recognize the many features of quality wrenches. It will give you a quick, professional working knowledge of many little-known "TOOL FACTS" that you can put to use immediately.

Years of research and testing on the job precede the manufacture of all Williams wrenches. Preparation of dies and tooling and all production operations are under continuous material and process controls. This is why Williams stands behind each wrench with a quality guarantee against defective workmanship and materials.

You'll find this concept of "making only the finest" explained in greater detail under the following classifications:

Williams wrenches are nationally available through Industrial Distributors, Automotive Jobbers, Hardware and Tool Stores.